SCHOOL OF CIVIL ENGINEERING

INDIANA DEPARTMENT OF HIGHWAYS

JOINT HIGHWAY RESEARCH PROJECT
JHRP-83-2

ENGINEERING SOILS MAP OF PIKE COUNTY, INDIANA

Chen-Tair Huang

PURDUE UNIVERSITY

Final Report

ENGINEERING SOILS MAP OF PIKE COUNTY, INDIANA

TO: H. L. Michael, Director
Joint Highway Research Project

FROM: R. D. Miles

February 9, 1983

Project: C-36-51B

File: 1-5-2-68

Attached is the Final Report on the "Engineering Soils Map of Pike County, Indiana". The map and report have been prepared by Mr. Chen-Tair Huang, Graduate Assistant on our staff under the direction of Professor Robert D. Miles.

This is the 67th county map which has been completed by using aerial photography and available information. The map and report should be very useful in planning and developing engineering facilities in Pike County.

The Report is presented to the Board as a final report showing completion of the Pike County engineering soils mapping project.

Sincerely,

Robert D. Miles

Robert D. Miles

RDM:ms

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Final Report

ENGINEERING SOILS MAP OF PIKE COUNTY, INDIANA

by

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Graduate Assistant

Joint Highway Research Project

Project No.: C-36-51B

File No.: 1-5-2-68

Prepared as Part of an Investigation

Conducted by

Joint Highway Research Project
Engineering Experiment Station
Purdue University

In Cooperation with

Indiana Department of Highways

Purdue University
West Lafayette, Indiana
February 9, 1983

ACKNOWLEDGMENTS

The author wishes to thank Dr. D. W. Levandowski and Dr. T. R. West, Department of Geosciences, Purdue University for their assistance on this project. Special thanks is due Professor Robert D. Miles for guidance on the soil mapping and for review of the report. The author also wishes to thank the members of the Board of the Joint Highway Research Project for their support of the county soil mapping project.

All airphotos used in connection with the preparation of this report were obtained by the Indiana Department of Highways and the United States Department of Agriculture.

Engineering Soils Map of Pike County, Indiana

Introduction

The engineering soils map of Pike County, Indiana which accompanies this report was done primarily by airphoto interpretation. The aerial photographs used in this study, having an approximate scale of 1:24,000, were taken on October 17, 1977 by the Indiana Department of Highways. Aerial photographic interpretation of land forms, parent materials and engineering soils of this county was accomplished in accordance with accepted principles of observation and inference (1).

A field trip was made to the area for the purposes of resolving ambiguous details and correlating aerial photographic patterns with soil texture. The final land form and parent material boundaries were graphically reduced to produce the engineering soil map (1 inch = 1 mile). Standard symbols developed by the staff of the Airphoto Interpretation Laboratory, School of Civil Engineering, Purdue University, were employed to delineate land forms, parent materials and soil textures. Parent material symbols were grouped according to land form and origin, and textural symbols were superimposed to indicate the relative compositions of the parent materials. The text of this report largely represents an effort to overcome the limitation imposed by adherence to a standard symbolism and map presentation.

The map also includes a set of soil profiles which indicate the general soil profiles in the various land form-parent

material areas. The soil profiles were compiled from the agricultural literature and from the boring data of roadway soil surveys along S.R. 57, S.R. 64, and S.R. 25 (Appendix B). These data were supplied by the Indiana Department of Highways. Liberal reference was made to the "Formation Distribution and Engineering Characteristic of Soils" (2).

Description of the Area

General

Pike County is located in the southwestern part of Indiana (Figure 1). The county seat, Petersburg, is 115 miles southwest of Indianapolis, and 45 miles northeast of Evansville. The county is bounded on the east by Dubois County, on the west by Gibson County, on the south by Warrick County and on the north by Knox and Daviess Counties. The total area of the county is 338 square miles or 216,320 acres.

Drainage Features

Drainage features of Pike County are shown in Figure 2, "Drainage Map - Pike County, Indiana", prepared by the Joint Highway Research Project, Purdue University 1953 (3). Pike County lies within three drainage basins of the state (4). The southern part is in the Minor Ohio basin. The central part is in the Patoka basin. The northern fourth is divided between the White River basin proper and the East Fork White River subdivision of this basin.

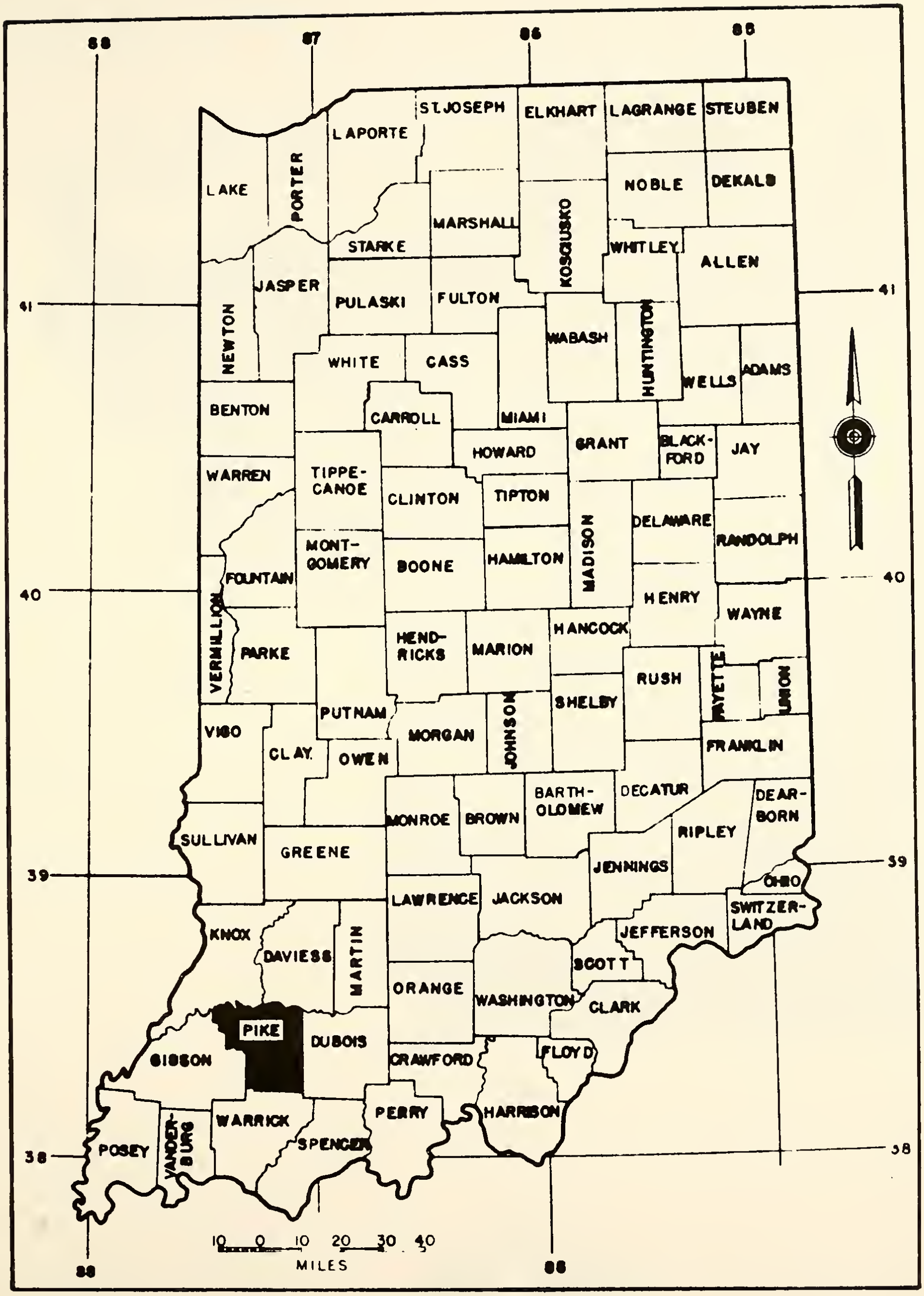


FIG. I LOCATION MAP OF PIKE COUNTY

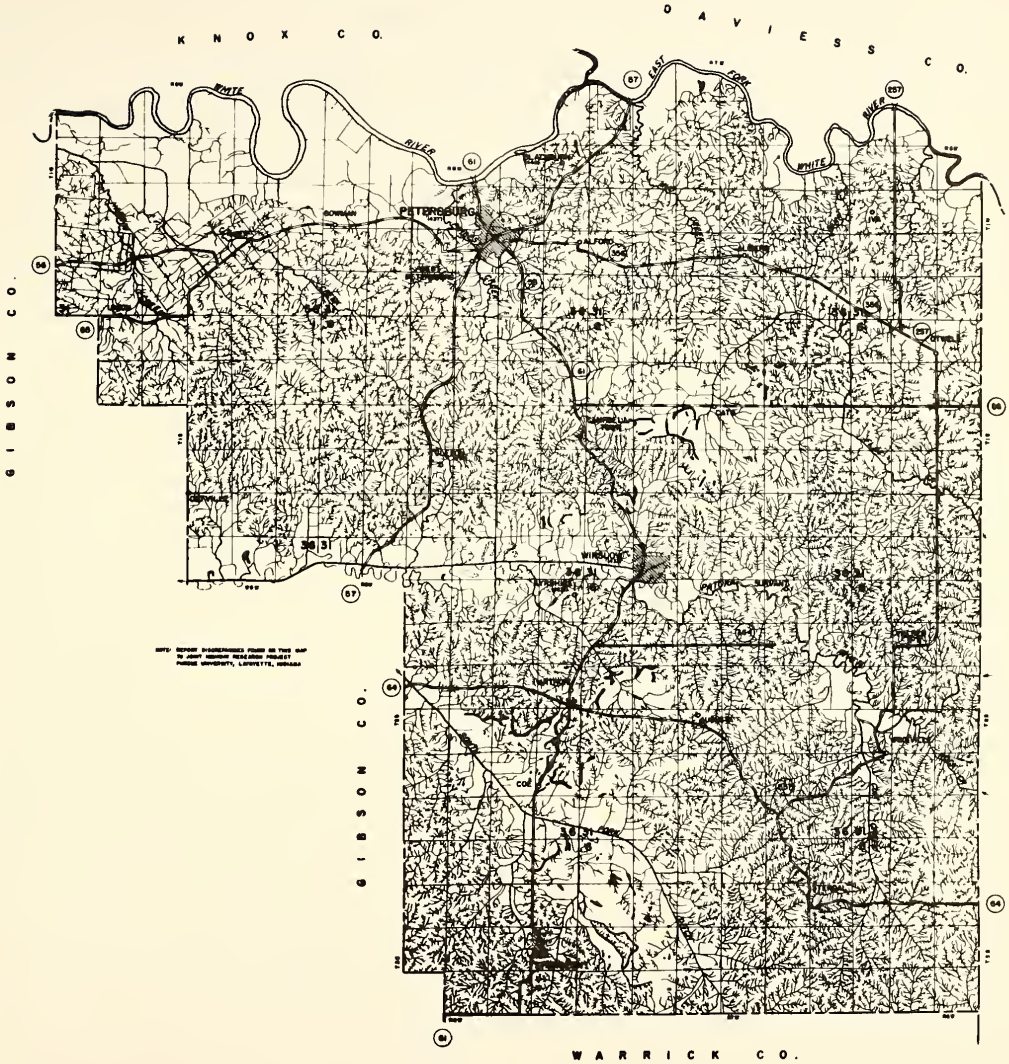


FIG. 2

DRAINAGE MAP

PIKE COUNTY

INDIANA

The Ohio River is the master stream which eventually receives all the drainage of the county. The extreme southeastern and southwestern parts drain directly into the Ohio River, but the rest of the drainage reaches the Ohio River indirectly through the Patoka, White and Wabash Rivers. The Patoka River drains two-thirds of the county, and the White River drains the rest except for the very small areas that drain into the Ohio River.

The White and East Fork White Rivers acted as glacial sluiceways. Preglacial watershed divides occur in the northern and eastern parts. The southeasterly course of Flat Creek is noticeable. Cup Creek flows in a northerly direction. The Patoka River is a sluggish stream flowing through an aggraded valley except in the eastern part where it flows in a narrow, deep valley. Its course is meandering in the eastern part. The lower portion of the valley of South Fork Patoka River is aggraded. Both the lower reach of the Patoka River and the South Fork Patoka River are ditched to improve runoff.

Surface drainage is thoroughly developed in the uplands. Erosion has been active. Upland drainage is integrated in many places. Drainage patterns are fine-textured rectangular systems in most of the dissected uplands with the exception of a few flat areas on the main divides and several extensive slackwater plains in the vicinity of Cato, Otwell, and Alford. The county is well drained. The southwestern one-third, with its greater relief and deep V-shaped valleys, is excessively drained. In general, the

streams through the lacustrine plain exhibit low gradients. Flat Creek drains an old lakebed; it has a low gradient. In the northeastern part, streams draining into the East Fork White River are small. Likewise, most tributaries of the Patoka River from the north are small. There are no natural lakes in Pike County.

The courses of the natural drainageways are disrupted in many places due to strip mining operations. Ditches are dredged in the lakebed areas and some of the larger streams are straightened by dredging. The Patoka River is dredged in the western part. The abandoned meanders of Patoka River exist in the flood plain.

A stream gaging station is located on White River at Petersburg (5). The drainage area of White River above Petersburg is about 11,000 square miles (5).

Climate

Pike County is in a section characterized by warm humid summers and moderately cold winters. There are wide differences between the summer and winter temperatures and the mild winters are frequently broken by severe cold snaps. The rainfall is, in general, well distributed throughout the year, but a period of drought may occur during July and August.

The average length of the frost-free season is 184 days, from April 16, the average date of the latest recorded frost, to

October 17, the average date of the earliest.

Table 1, compiled from the records of the United States Weather Bureau Station at Princeton, Gibson County, give the essential data regarding weather conditions in Pike County.

Physiography

Pike County lies wholly within the Sullivan Lowland physiographic region of the state (Figure 3). With respect to the physiographical situation in the United States, the northwestern third of the county is in the Till plains section of the Central Lowland Province and the remainder of the county is in the Interior Low Plateau Province (4).

The main physiographic features of the Sullivan Lowland in Pike County are the filled-in or aggraded valleys and the presence of monadnocks (island hills). An area of such character is 1.5 miles northeast of Stendal.

Topography

The topography of the county is diversified (Figure 4). The county is partially a glacial plain and partially a residual plain. It may be divided into four divisions. The rough, highly dissected, southeastern part extends westward toward Spurgeon and northwestward toward Pikeville, Augusta, and Winslow. This section is characterized by moderately long, narrow, sharp ridges having little change in summit elevation from the 600-foot level, with hillsides sloping sharply into narrow V-shaped valleys.

Table 1. Normal and Extreme Monthly Temperature and Precipitation of Princeton, Gibson County

Month	Temperature			Precipitation			
	Mean F°	Absolute Maximum F°	Absolute Minimum F°	Mean Inches	Driest Year (1930)	Wettest Year (1882)	Average Snowfall
January	31.8	72	-18	3.66	1.00	2.50	8.6
February	34.0	76	-20	2.98	3.40	3.50	6.8
March	44.6	88	2	4.22	1.70	2.84	4.7
April	55.3	91	20	3.63	2.30	3.62	0.4
May	65.0	100	28	3.78	6.10	4.10	Trace
June	74.1	105	39	4.09	0.10	5.35	0.0
July	77.7	111	48	3.09	1.00	9.68	0.0
August	75.9	106	43	3.27	0.25	12.85	0.0
September	69.7	105	27	3.43	2.10	2.00	0.0
October	57.2	95	21	2.68	1.00	6.47	Trace
November	45.2	82	-4	3.25	3.90	3.00	0.8
December	35.5	71	-12	3.48	5.10	3.15	5.3
Year	55.5	111	-20	41.56	27.95	59.06	26.6

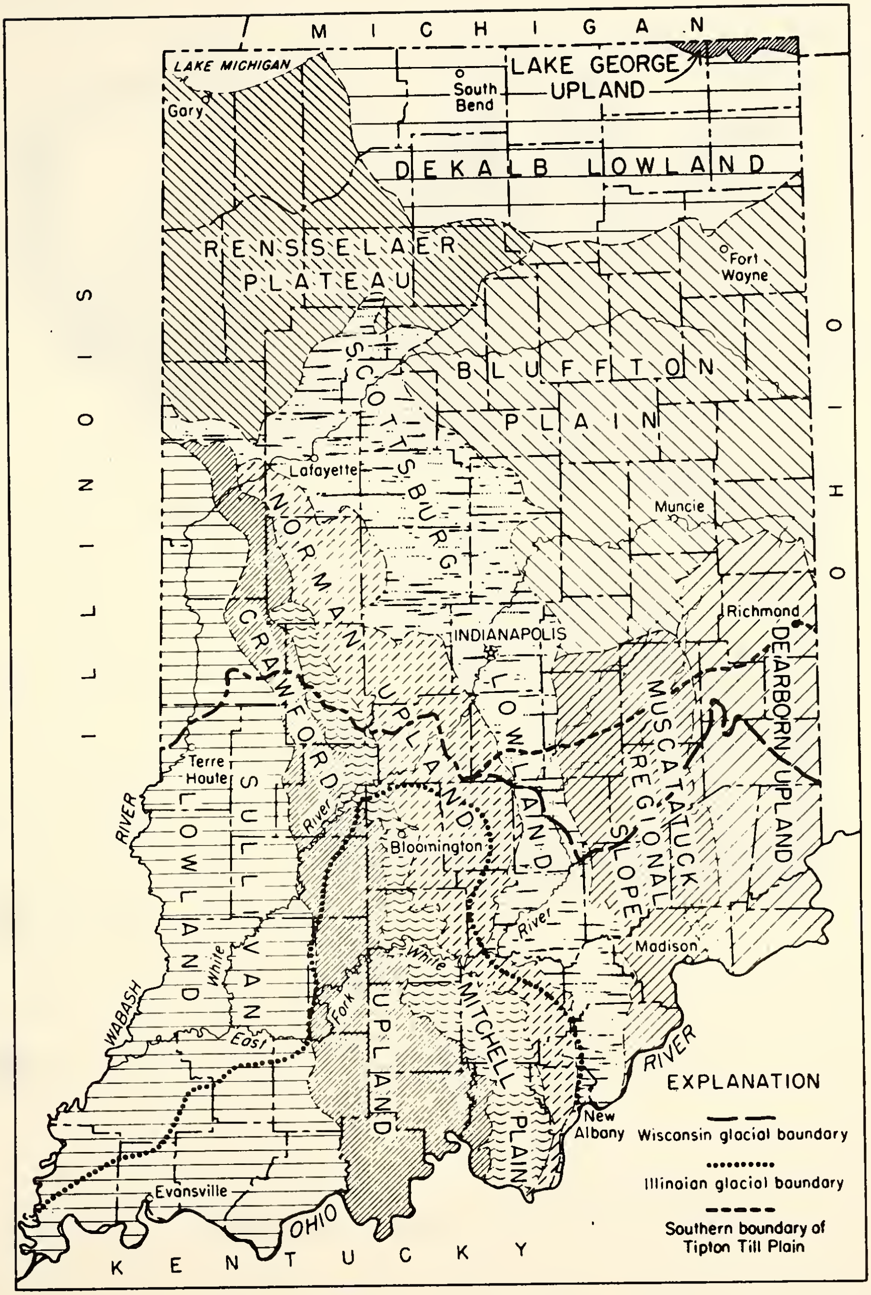


FIG. 3 Map of Indiana showing bedrock physiographic units. Slightly modified from Indiana Geol. Survey Rept. Prog. 7, fig. 3.

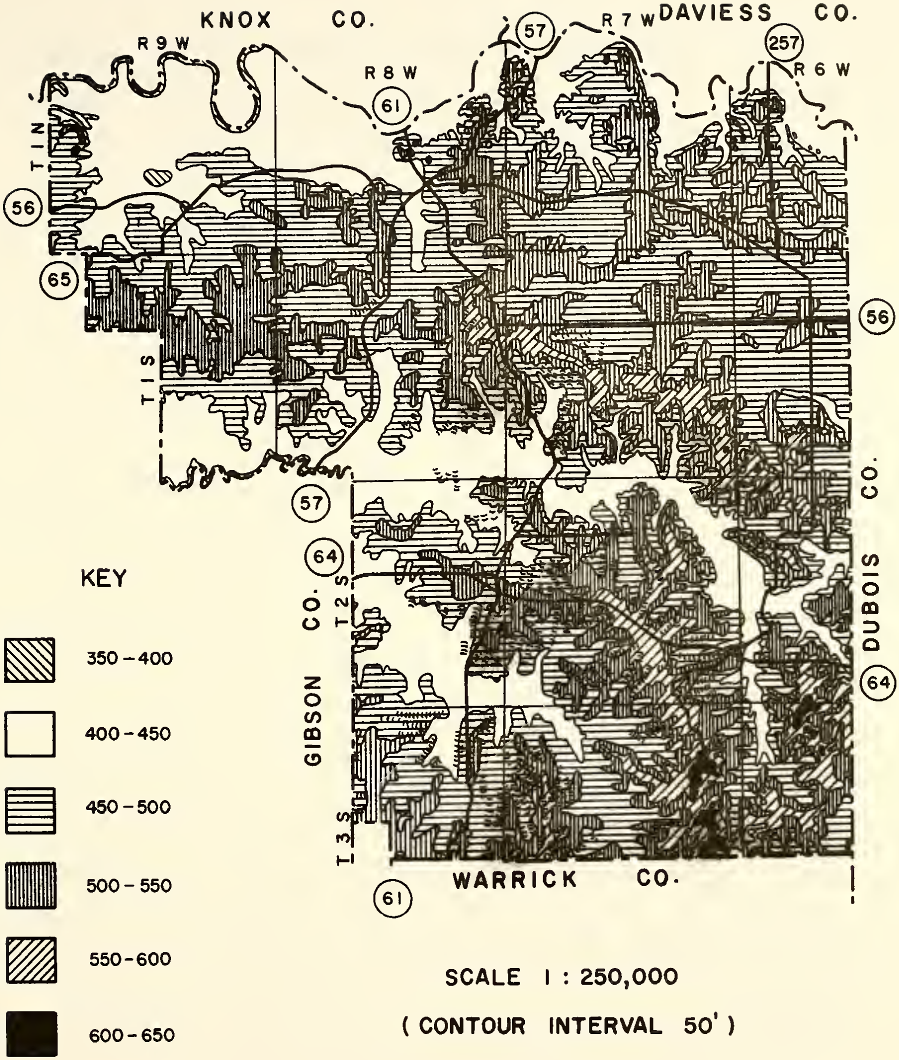


FIG. 4 TOPOGRAPHIC MAP OF PIKE COUNTY

The rolling, highly dissected, western part of the county extending south of Oatsville and Glezen through Muren and Spurgeon is a remnant of a former peneplain developed near the 500-ft level in the soft shale and sandstone. This rolling section is characterized by long, smooth and rounded hills.

The action of the Illinoian ice sheet, or glacier, from the northwest is directly or indirectly responsible for the smooth relief of the northern part of the county. Two types of land surface occur here - the one a flat stream-dissected lake plain and the other a more thoroughly dissected rolling till plain at about the same level of 500 feet. The advent of the ice sheet resulted in the blocking of the preglacial White River and its four northwesterly flowing tributaries from the present Potoka drainage basin. This blocking and derangement of streams with the consequent ponding of their waters formed the present lake plain in the northeastern part of the county. Near Cato the glacial lake section is a flat featureless plain from which the sandstone plain to the south rises abruptly. The northern boundary of this lake plain grades into the till plain at about the same elevation in some places, but in most places the difference in elevation of the two plains ranges from 5 to 10 feet.

The surface of the glacial till plain is marked by long broad ridges, a few of which have smooth flat tops. The ridges drop sharply, over steep non-agricultural hillsides, into deeply

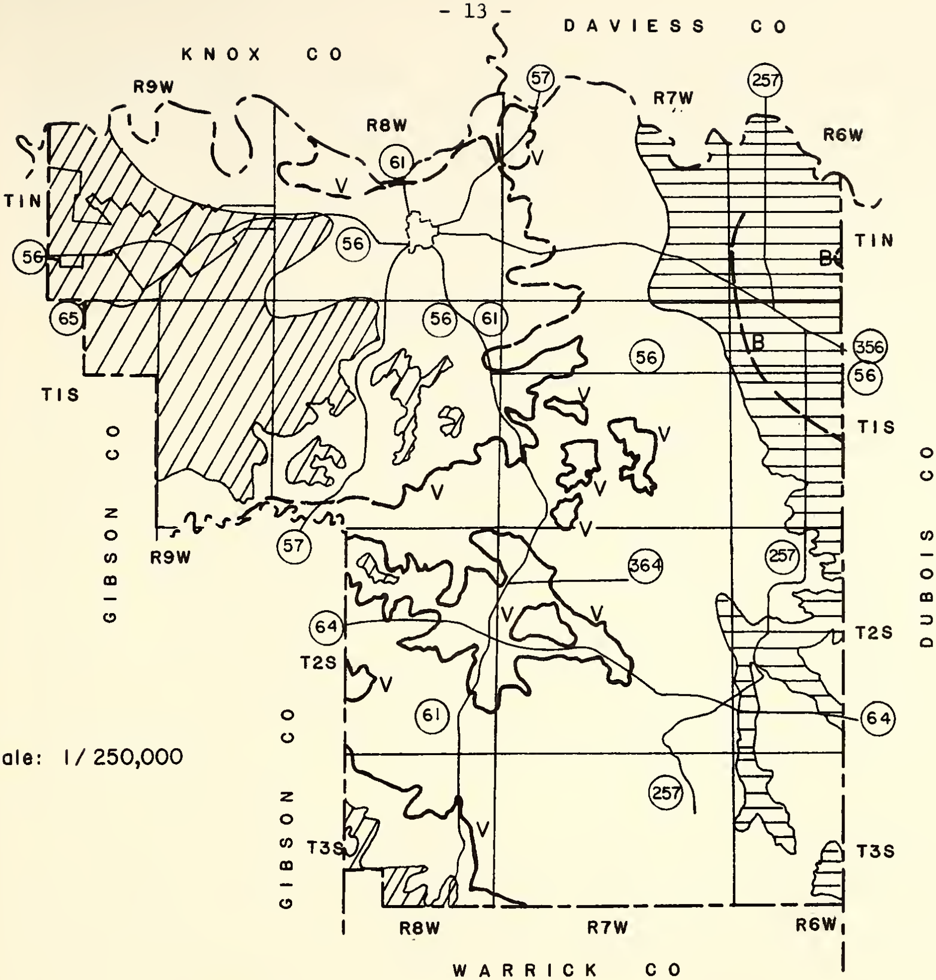
entrenched V-shaped valleys in the upper stream courses, but the valleys broaden abruptly where they join other streams. Owing to the unconsolidated parent material and the steep slopes, erosion is active and stream cutting is rapid.

Probably the highest elevation is 2 1/2 miles southeast of Stendal where a series of hills rises to a height of 660 feet. The minimum elevation is 400 feet at the points where the Patoka and White Rivers leave the county. The average elevation is about 525 feet. The southeastern corner probably exhibits the greatest local relief. The ridge southeast of Augusta, with an elevation of 620 feet, drops to 440 feet along Beadens Creek. The elevation at Stendal is 620 feet; Augusta, 560 feet; Pikeville, 520 feet; Winslow, 480 feet; Velpen, 520 feet; Spurgeon, 500 feet; Little, 500 feet; White Oak, 580 feet; Otwell, 500 feet; Petersburg, 480 feet; and Union, 460 feet (9).

Geology

The surface and near surface geologic ages represented in Pike County are the Quaternary period and the Pennsylvanian age. The Quaternary materials are both pleistocene and recent in age.

Figure 5 shows a generalized bedrock geology map of Pike County (6). Except for parts of the eastern and northwestern parts of the county, which are underlain by rock units of the Raccoon Creek Group (Mansfield, Brazil and Staunton Formations) and the Lower McLeansboro Group (Shelburn and Patoka Formations) respectively, most of the county rests on the Alleghenian



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LEGEND

(After Gray, Henry H., etal. 1970)

— Racoon Creek Group
shale, sandstone, limestone, clay & coal

B — Top of Buffaloville coal member

— Carbondale Group
shale, sandstone, limestone, clay & coal

V — Top of Springfield coal member

— McLeaneboro Group lower part
shale, sandstone, limestone &thin coal

FIG. 5 UNCONSOLIDATED MATERIAL OF PIKE COUNTY

Carbondale Group (Linton, Petersburg and Dugger Formations). Small outcrops of the Shelburn and Patoka Formations are present in the southwestern corner of the county. Figure 6 gives a columnar section showing bedrock units for the county (6).

Land Form and Engineering Soil Areas

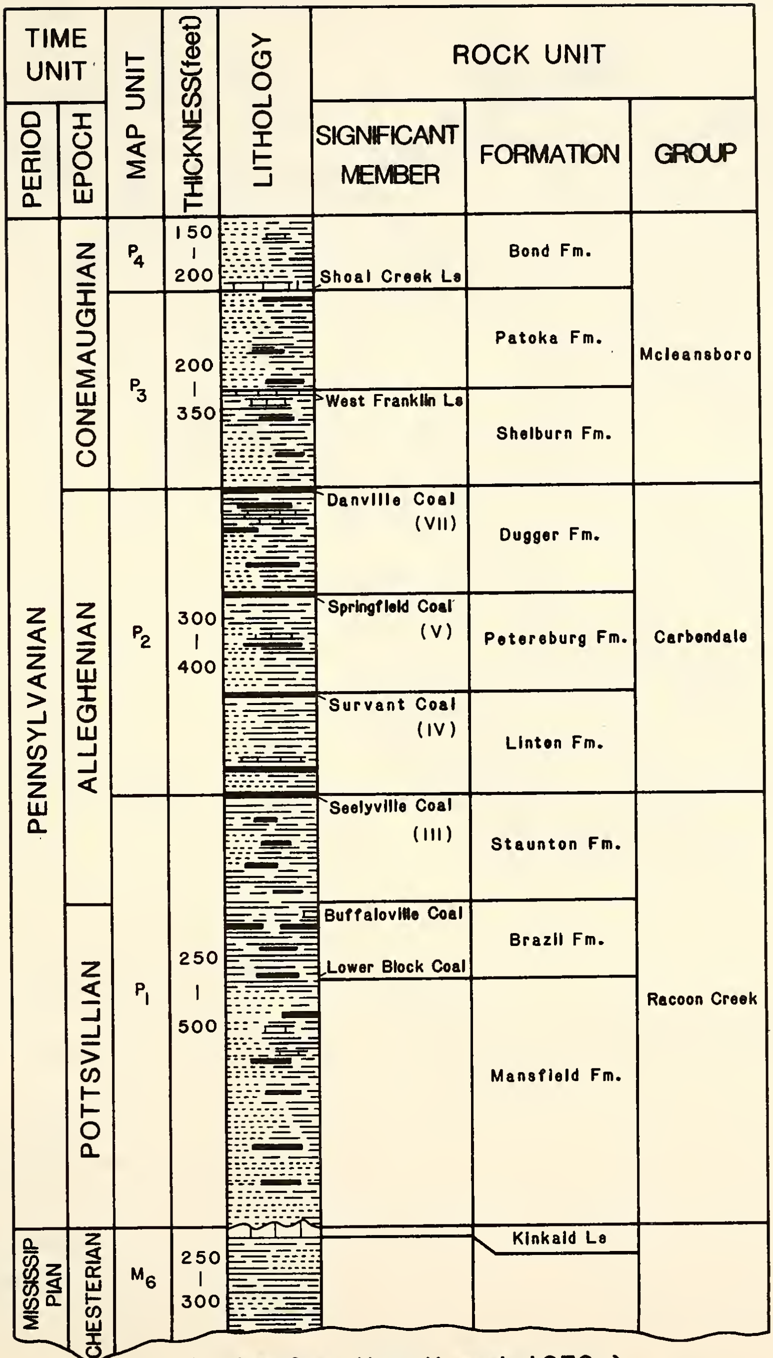
The engineering soils in Pike County are derived both from the unconsolidated material and from weathering of sandstone and shale bedrock (Figure 5). The unconsolidated materials include glacial deposits, fluvial deposits, and eolian deposits (Figure 7). The sandstone and shale belt, comprising 40 percent of the county, lies in the vicinity of and southward from Winslow. It is the most rolling section of the county and is characterized, particularly in the western part, by sharp V-shaped valleys and narrow ridge tops.

In the unconsolidated part, the relief ranges from that of a flat lake plain to that of a moderately rolling, loess covered, till plain.

The entire county essentially is covered by loess of varying depth as indicated in Figure 8 and tabulated in Appendix A (7). The deepest deposit occurs at the northwestern corner of the county and the depth decreases toward the northeastern corner.

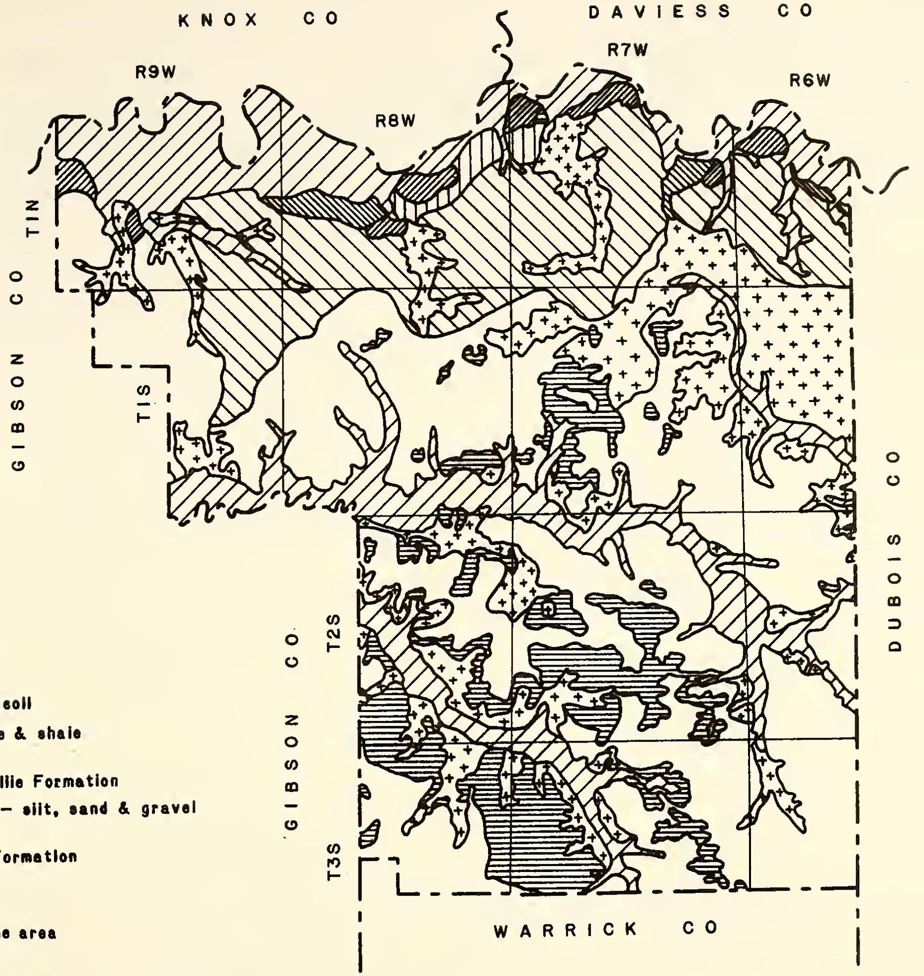
Fluvial Deposited Materials

The fluvial drift in Pike County include: alluvial plains, terraces, valley trains and lacustrine plains.



(After Gray, Henry H., etal. 1970)

FIG. 6 COLUMNAR SECTION SHOWING BEDROCK UNITS PIKE COUNTY



Residual soil
sandstone & shale

Martinsville Formation
alluvium – silt, sand & gravel

Jessup Formation
till

Strip mine area

Lacustrine facies of Atherton Formation
clay, silt & sand

Dune facies of Atherton Formation
sand

Valley train – deposit
outwash facies of Atherton Formation
gravel, sand & silt

Atherton Formation
loess pacies, silt

(After Gray, Henry H., etal. 1970)

FIG. 7 CONSOLIDATED MATERIAL OF PIKE COUNTY

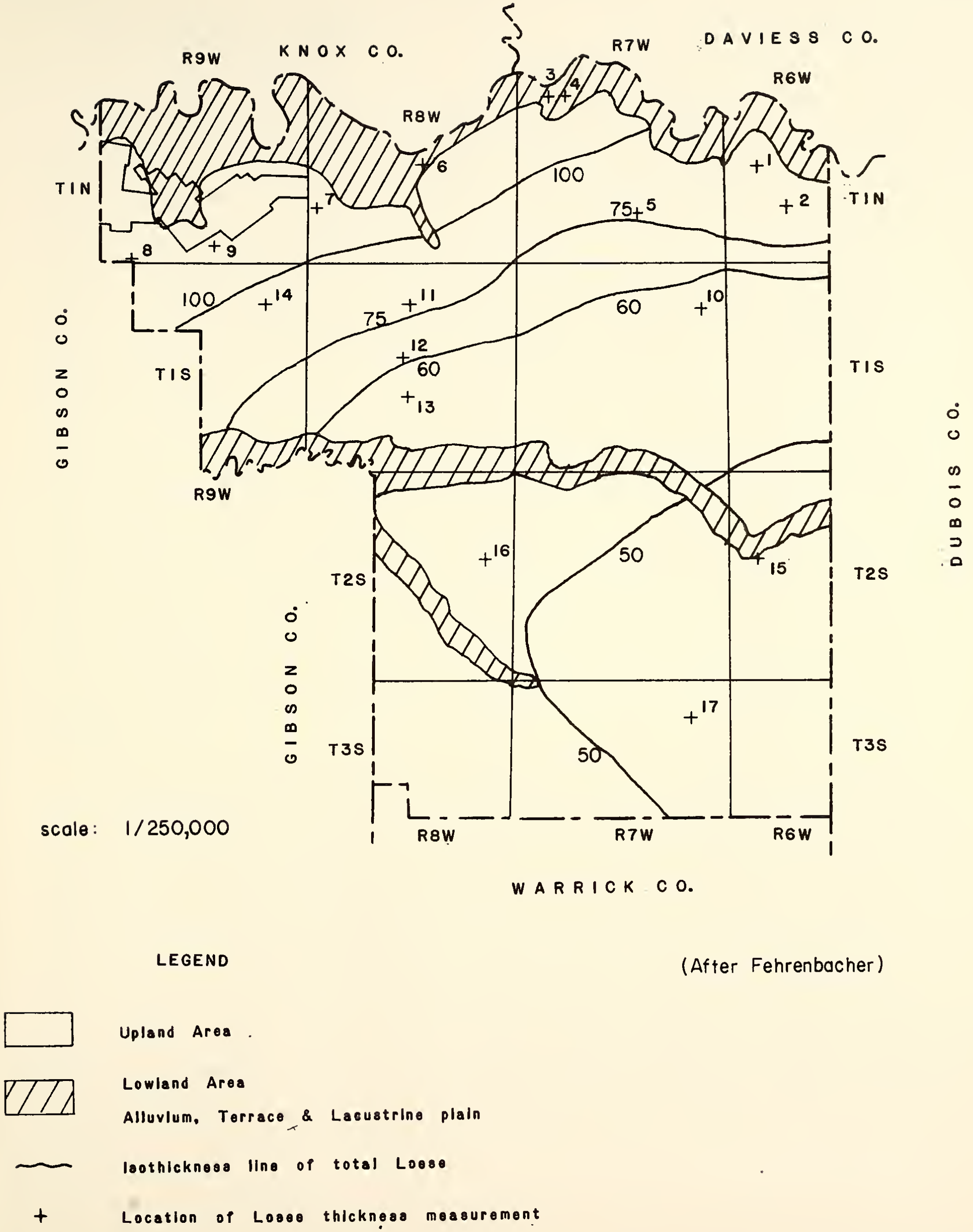


FIG. 8 ISOPACHOUS MAP OF LOESS DEPOSIT IN PIKE COUNTY

1. Alluvial Plains

The great bulk of the fluvial drifts are sandy silts, silts and clays that have been deposited upon the flood plains of the many stream valleys in the county. The two largest alluvial plain areas (bounded by sawteeth on the map) are along the White River and Patoka River. The tributaries to these streams also have small alluvial plains. Annual flooding is anticipated within the areas.

Parent material, at a depth of 30 in. to 60 in. (76-152 cm) is usually stratified silty or sandy loam (A-4 soils), or loam (A-2 soils). The thickness of the surface layer varies from 8 in. to 55 in (20-140 cm) and is silty clay loam (A-6 soils) or silt loam (A-4 soils). The subsoil, at a depth of 8 in. to 40 in. (20-102 cm) is silty clay loam (A-6 soils) or silt loam (A-4 soils).

Boring data from sites #1 to #3 reveal the variablity of the texture of the alluvial deposits. At site Nos. 1 and 2 silty clay (A-6 soil) is found immediately below the topsoil and the sandy loam (A-2-4) further down. At site No. 3, sandy loam (A-2-4) is found below the top soil. The sandy loam is composed of 71% sand, 10% silt, and 19% clay. Below this is a silty clay loam (A-6) and at depth a loose sandy loam (A-2-4) soil layer occurs. Flooding is the major problem in this area.

2. Terraces and Valley Trains

Along the White River there are a few terraces and valley train deposits. They are about 10 to 20 feet (3 to 6 m) higher than the bottom land adjacent to them. The break between the upland and the terraces and valley trains is clearly defined.

The soil profile consists of a sandy loam to silty clay loam topsoil underlain by a silty clay loam to clay then a gravelly to a sandy clay subsoil.

3. Lacustrine Plains

The soils developed from lacustrine deposits occupy the flat plain extending from the vicinity of Cato to Jasper in Dubois County (9).

The topography of the lacustrine plain is a nearly level plain broken only by widely spaced drainage channels. The dendritic or leaflike plan of the deposits shows that the lakes occupied valley systems that had been eroded earlier by streams. The upper surfaces of the lake deposits are nearly flat, and therefore, the deposits are thin in upstream branches and thicker down valley (10).

The soil is developed partly from the thin loess cover and partly from the sheet wash materials. The thickness of the top soils varies from 15 in. to 23 in. (38-58 cm) and is silt loam (A-4 or A-6 soils). The subsoil at depth of 15 in. to 55 in. (38-140 cm) is silt loam (A-6 soils) or silty clay loam (A-7 soils). Stratified silty clay loam, silty clay, silt loam or

sandy loam (A-4, A-6, or A-7 soil) is found as underlying soils.

Most engineering problems associated with the lacustrine deposits are the result of the behavior of contained water within the soil. The lacustrine material is very porous, and, in most places, it is water saturated. Typically, the more permeable materials are scattered through the lake deposits as thin horizontal layers and lenses and they provide the only effective avenues for water movement. In undisturbed samples these layers are usually recognized because they are oxidized and are slightly rusty colored, in contrast to the dull blue-gray of the less permeable, saturated, finer material.

Eolian Drift

There are extensive eolian (wind) deposits in Pike County. The eolian deposits are subdivided into two groups: sand deposits and loess deposits.

1. Windblown Sand Deposits

Windblown sand deposits are very limited in Pike County. They are scattered along the southern part of the White River bluffs and occur as dunes.

The materials of the sand dune are predominantly fine, uniform, windblown sand including a considerable amount of silt and some clay particles mixed with the sand especially in the surface layer.

On the aerial photographs the surface of the sand area appears to have a very coarse texture when compared with that of loess. In the sand area, drainage is mainly internal thus reducing the number of gullies to a minimum. As the water infiltrates the sand it tends to form slight infiltration areas producing a somewhat darker area on the airphoto pattern. These darker areas create a speckled appearance which contrasts with the more uniform gray tone or mohair appearance of the loess (8).

The soil profile of sand dune deposits consists of a loamy fine sand, (A-2), fine sand (A-3) or sandy loam (A-4) topsoil, overlaying a sandy clay loam to sandy loam (A-4) subsoil.

Little or no problems other than stabilization and compaction are expected in this area. However, if deep cuts are required the characteristic of the underlying till materials should be taken into account.

2. Windblown Silt Deposits

The silt deposits were blown by northwest winds from the river valley and lacustrine plains and were deposited on the hills during the Wisconsin glacial period and recent times.

About one fifth of Pike County is considered as loess hills. The loess deposits are thicker (about 25 feet or 7.5 m) at the northwestern corner of the county as illustrated in Figure 6 and Appendix A.

In Pike County, the land form of the loess is influenced by the underlying material. As a result of its method of deposition the loess tends to modify and smooth out the existing topography. The resulting effect gives the interpreter the impression that a mantle has been placed over the area giving it a smooth, gently rolling surface, thus, reducing minor differences in elevation and streamlining irregular topography. This streamlining or windswept appearance and the overall mantling effect are important features in the identification of loess.

(a) Moderately Deep Loess Deposits Covered Till Plains

The till plains covered with moderately deep loess deposits contain pedological soils known as the Alford soil. The parent material is leached loess more than 5 feet (1.5 m) thick. The soil profile of loessial deposits consists of silt loam (A-4) topsoil and silty clay loam (A-6) subsoil. The material below the loess is till.

Boring sites #4 to #6 shows that a 5-8 ft. (1.5m - 2.4m) silty clay loam (A-4) is followed by 2.5 ft. (0.7m) of clay (A-8) and then 5-8 ft. (1.5m - 2.4m) of clay loam (A-4) before the bedrock (Shale) is reached.

The engineering problems in this area are primarily the control of moisture during construction and compaction of the silty material. The subgrade is weak under adverse moisture or due to frost action in winter. Pumping and erosion are potential problems in this region.

(b) Loess Covered Sandstone-Shale

About one ninth of Pike County is classified as loess covered sandstone-shale area. The deposit is confined mainly to the neighborhood of Campbelltown and Glezen. The region is dissected by streams and gullies.

Since the sandstone-shale bedrock is covered by a blanket of loess with a thickness which varies from 48 to 72 inches (1.2 m to 1.8 m) the upper soil profile is derived from the leached loess material. The top soil is silt loam (A-4 or A-6 soils). The subsoils are predominantly silty clay loam (A-6 or A-7 soils) with a fragipan (A-6 or A-7 soils). The weathered sandstone-shale residual soil is sandy loam, silt loam or clay under the loess deposits.

Engineering problems in this soil region are generally associated with the different characteristics of the underlying residual bedrock soils and bedrock materials. A shallow cut and fill alignment encounters several different materials in a short distance.

(c) Discontinuous Loess Over Weathered Sandstone and Shale

The sandstones and shales occupy about 39 percent of the county and occur principally in the southern part. In the southeastern part the sandstone is harder and more resistant to weathering, but in the southwestern part, the sandstone is softer and shale is more abundant.

The area may be covered by loess from 18 to 40 inches (45 to 100 cm). The soil parent materials are weathered Pennsylvanian siltstone, shale and sandstone and the overlying loess. The topsoil is silt loam (A-4 or A-6 soils). The subsoils range from silt loam (A-4 or A-6) to silty clay loam (A-6 soils) with fragipan (A-4 or A-6 soils). The underlying material is silt loam, loam or sandstone and shale.

The engineering problems associated with this region are associated with the cuts and fills. Different types and characteristics of residual soils or bedrock are encountered within short distances both horizontally and vertically.

Miscellaneous

Strip Mines

Intensive coal mining operations are observed on the aerial photographs of Pike County. The strip mines are mapped using the 1977 airphotos. Many new mines have been opened and old mine areas expanded since the 1977 photography; therefore, the areas marked on the engineering soils map are considered accurate as of the 1977 date.

Organic Deposits

There are no mappable organic deposits identified by the airphoto interpretation method in this county.

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APPENDIX A

LOESS THICKNESS MEASUREMENT IN PIKE COUNTY: BY J. B. FEHRENBACKER

Site No.	Township	Range	Section	Total Depth in Inches	Underlying Material
1	1N	6W	19, NE40, SE10	80	silt loam Illinoian till
2	1N	6W	29, NE160, NE40	75	silty clay loam Illinoian till
3	1N	7W	7, NE10	84?	-
4	1N	7W	8, NW160, NE40	110	very red Illinoian out wash soil
5	1N	7W	27, center	72	Illinoian till
6	1N	8W	22, NW160, NE40	110	red Sangamon soil
7	1N	8W	30, NW160	120	gritty subsoil (till)?
8	1N	9W	31, SE10	110	silt loam Illinoian lacustrine
9	1N	9W	34, NW160, SW40	100	silt loam Illinoian lacustrine
10	1S	7W	12, NW160	48	Illinoian till
11	1S	8W	9, NE40, SE10	75	silt loam Illinoian till
12	1S	8W	16, SW160	72	Illinoian till
13	1S	8W	21, SE40, NW10	55	Residuum
14	1S	9W	11, NE160, NE40	80	silt loam Illinoian till
15	2S	6W	18, NW160, SE40	45	sandstone soil
16	2S	8W	13, NW160, SW40	55	sandstone residuum
17	3S	7W	11, NE40	45	shale and sandstone soil

APPENDIX B

ENGINEER SOIL TEST RESULTS

Site	Station	Offset (ft.)	Depth (ft.)	Texture	Classification	Gravel	Sand	Silt	Clay	L.L.	P.L.	P.I.
1	1078+00	25 Rt	2.0- 4.0	A-0(18)	Silty Cl.	0	0.2	64.8	35	39	23	16
2	1083+00	30 Lt	3.5- 5.0	A-6(14)	Silty Cl. L.	0	0.7	73.3	26	35	22	13
3	1097+00	60 Lt	3.5- 5.0	A-z-4(0)	Sandy L.	0	71	10	19	24	18	6
4	1270+11	25 Lt	11.0-12.5	A-4(7)	Silty Cl. L.	0	13.7	60.5	17.1	34.4	27.6	6.8
5	1270+02	18 Rt	16.0-17.5	A-6(6)	Clay	0	35.1	34.6	14.8	37.5	25.8	11.7
6a	1269+96	19 Rt	2.0- 4.0	A-6(13)	Clay	3	18	34.0	24.8	39.5	22.4	17.1
6b	1269+96	19 Rt	16.0-18.0	A-7-6(27)	Clay	0	0.4	22.9	32.6	48.9	25.6	23.3
7a	1270+00	125 Rt	0.5- 5.5	A-6(12)	Clay	4.6	18.8	36.7	12.4	36.6	18.9	17.7
7b	1270+00	75 Rt	0.5- 5.5	A-4(5)	Silty L.	0	8.1	72.5	7.8	26.8	20.2	6.6
8	227+00	16 Rt	8.5-10.0	A-7-6(17)	Clay	0.6	20.0	39.7	39.7	40.8	18.2	22.6
9a	226+90	77 Lt	2.0- 4.0	A-6(9)	Clay L.	0	23.9	46.2	29.9	32.7	19.1	13.6
9b	226+90	76 Lt	1.0- 2.5	A-6(13)	Clay	0	17.9	49.6	32.5	36.0	19.1	16.9
10a	226+99	95 Rt	4.0- 6.0	A-6(6)	Clay L.	0	33.9	43.5	22.6	28.5	16.0	12.5
10b	226+99	95 Rt	12.0-13.6	A-6(15)	Silty Cl. L.	0	3.7	73.4	22.9	37.1	23.0	14.1
11	199+53	20 Rt	19.5-21.0	A-4(3)	Silt	0	3.5	81.5	15	18	11	7
12	200+59	20 Lt	4.5- 6.0	A-4(2)	Silty L.	0	11	77	12	22	17	5
13	203+25	20 Lt	29.5-31.0	A-4(0)	Silty L.	0	38	53			np	

* Cl. means Clay, L. means Loam.

The soil test data tabulated above was obtained from consultant's reports prepared for the Indiana State Highway Commission. The location of the site is shown on the attached engineering soils map.

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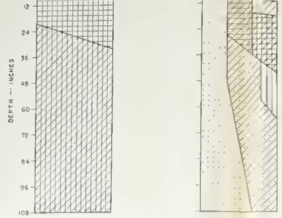
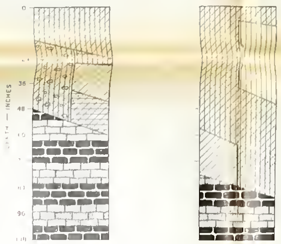
GENERAL SOIL PROFILES
TERRACE AND VALLEY TRAIN
LACUSTRINE PLAIN
FLUVIAL PLAIN ALONG WHITE RIVER
FLUVIAL PLAIN ALONG PATOKA RIVER
DEEP LOESS COVERED TILL
SAND DUNE
DISCONTINUOUS LOESS COVERED SANDSTONE-SHALE
MODERATELY LOESS COVERED SANDSTONE-SHALE
DEPTH — INCHES
KNOX CO.
DAVIESS CO.
GIBSON CO.
DUBOIS CO.
PETERSBURG
BOWMAN
UNION
OATSVILLE
ARDA
ALFORD
ALGIERS
IVA
OTWELL
CATO
CAMPBELL TOWN
WINSLOW
AYRSHIRE
SURVANT
VELPEN
ARTHUR
AUGUSTA
PIKEVILLE
COE
STENDAL
SPURGEON
LEGEND
PARENT MATERIALS
(GROUPED ACCORDING TO LAND FORM AND ORIGIN)
DEEP LOESS COVERED TILL
MODERATELY DEEP LOESS COVERED SANDSTONE – SHALE
DISCONTINUOUS LOESS COVERED SANDSTONE – SHALE
TERRACE , VALLEY TRAIN
LACUSTRINE PLAIN
ALLUVIAL PLAIN
SAND DUNE
MISCELLANEOUS
BORING SITE
LAKE OR POND
STRIP MINE
TEXTURAL SYMBOLS
(SUPERIMPOSED ON PARENT MATERIAL TO SHOW RELATIVE COMPOSITION)
GRAVEL
SAND
SILT
CLAY



DISCONTINUOUS LOESS COVERED SANDSTONE-SHALE

MODERATELY LOESS COVERED SANDSTONE-SHALE



TEXTURAL SYMBOLS FOR SOIL PROFILES

SILT | CLAY | LOAM | SAND

GRAVEL | SANDSTONE | SHALE | STONE

TEXTURAL SYMBOLS
(SUPERIMPOSED ON PARENT MATERIAL TO SHOW RELATIVE COMPOSITION)

GRAVEL

SAND

SILT

CLAY

ENGINEERING SOILS MAP

PIKE COUNTY

INDIANA

PREPARED FROM
1937 AAA AERIAL PHOTOGRAPHS

BY

JOINT HIGHWAY RESEARCH PROJECT

AT

PURDUE UNIVERSITY

1982

SCALE OF MILES

1 3/4 1/2 1/4 0 1 2 3 4

PREPARED UNDER THE SUPERVISION OF C. T. HUANG AND R. D. MILES

DRAWN BY E. P. H. CHEN

COVER DESIGN BY ALDO GIORGINI